HEALTH BASICS

Antibody

An antibody is an immune protein that recognizes a specific target.

WHAT IT IS
An immune protein that recognizes a specific target

WHERE IT COMES UP
Blood tests, infections, vaccines, allergies, and immune treatments

WHY IT MATTERS
Helps defend you and can guide testing or treatment

WHAT IT IS NOT
Not an antigen, disease, or diagnosis

WHO TO ASK
Primary care clinician or the service ordering your test

HOW IT IS CHECKED
Blood testing for antibodies against a specific target

Overview

An antibody is a protein made by your immune system. Its job is to recognize and bind to a particular target, such as part of a virus, bacterium, toxin, or other substance.

Antibodies are also called immunoglobulins . They circulate in blood and are found in body fluids and tissues, including saliva, tears, breast milk, and the lining of the nose and gut.

An antibody is not a disease or a diagnosis. It is also not the same as an antigen . An antigen is the target that an antibody recognizes. For example, a protein on the surface of a virus can act as an antigen.

You may see antibodies mentioned in:

An antibody result only has meaning when it is linked to a specific target and clinical question. "Antibody positive" by itself does not explain whether you have an active illness, are protected from infection, or need treatment.

- Blood test results
- Vaccine information
- Tests for past or current infection

- Allergy or autoimmune testing
- Pregnancy and blood transfusion care
- Treatments called monoclonal antibodies

How it works

Antibodies are made by immune cells called B cells . When activated, some B cells develop into plasma cells, which release large amounts of antibody. Other B cells become memory cells that may respond more quickly if the same target appears again.

The tips of an antibody fit a particular antigen, somewhat like a key fitting a lock. This fit is specific, although some antibodies can also bind to closely related targets.

After binding, antibodies can help in several ways. They may block a virus or toxin from attaching to cells. They can tag microbes or damaged cells so other parts of the immune system remove them. Some also activate a group of blood proteins called the complement system , which helps clear certain threats.

There are several antibody classes. The main ones are IgM, IgG, IgA, IgE, and IgD.

IgM often appears early during an immune response. IgG is common in blood and may remain after an infection or vaccination. IgA helps protect moist surfaces such as the mouth, airways, and gut. IgE is involved in allergic reactions and defence against some parasites. IgD mainly acts as a receptor on B cells.

These patterns are useful, but they are not simple clocks. Finding IgM does not always prove that an infection is recent, and finding IgG does not always show when exposure occurred.

Manufactured antibodies are called monoclonal antibodies . They are designed to bind to one chosen target. Depending on the product, they may block inflammation, mark cancer cells, replace a missing immune function, or affect a particular part of the immune response.

Why it matters for your health

An antibody test can help answer a focused question. It may look for evidence of a past infection, check the response to a vaccine, investigate an autoimmune condition, or identify antibodies that matter before a blood transfusion.

Some tests report only "positive" or "negative." Others report an amount, level, or titre , which is a laboratory measure of how much antibody activity was detected. The reference range and meaning are specific to the test.

Timing matters. Your body usually needs time to produce detectable antibodies after an infection or vaccination. Testing too early can give a negative result even when exposure occurred. Antibodies may also fall below the test's detection level later.

A positive result can have several meanings. It may reflect a previous infection, vaccination, an autoimmune response, a cross-reaction with a similar antigen, or occasionally a false-positive result. A positive antibody test does not always mean that an infection is active or contagious.

Likewise, antibodies are only one part of immune protection. A detectable antibody may not guarantee immunity, while a low or undetectable level does not always mean that all protection is gone. Memory B cells, T cells, and other immune defences may also be involved.

Newborn babies receive some IgG antibodies through the placenta. Breast milk also provides antibodies, especially IgA, at the surfaces of the baby's mouth and gut. These are borrowed antibodies rather than proof that the baby has produced the same immune response.

What can go wrong

Sometimes antibodies react against the body's own cells. These are called autoantibodies . They can be associated with autoimmune diseases such as lupus, rheumatoid arthritis, or autoimmune thyroid disease. However, an autoantibody can sometimes be found in someone without that disease. Diagnosis usually depends on symptoms, examination findings, and other tests.

In allergies, IgE antibodies respond to substances such as foods, pollen, insect venom, or medicines. The antibody itself is not the allergy diagnosis. Test results must be compared with what happens after exposure because sensitization-a positive test-does not always mean a person develops an allergic reaction.

Some immunodeficiency conditions involve too few antibodies or an inadequate antibody response. Tests may measure total immunoglobulins or the response to particular vaccines. A single low result may need confirmation and clinical interpretation.

Blood group antibodies can react with donated red blood cells. Blood services screen for these antibodies and match blood to reduce the risk of a transfusion reaction. Certain red-cell antibodies during pregnancy can also affect a fetus, so they may require planned monitoring.

Occasionally, one group of plasma cells makes a large amount of one antibody or antibody fragment, called a monoclonal protein . This can occur with monoclonal gammopathy of undetermined significance, known as MGUS, and with conditions such as multiple myeloma. Finding a monoclonal protein does not by itself establish which condition is present.

Misleading test results are another concern. False-positive results, false-negative results,

cross-reactions, test timing, and laboratory cutoffs can all affect interpretation.

Seek emergency help for signs of a severe allergic reaction, such as trouble breathing, swelling of the tongue or throat, fainting, or rapidly worsening symptoms after an exposure. During a blood transfusion, immediately tell the clinical staff about fever, chills, breathing difficulty, or chest or back pain.

An unexpected antibody result without emergency symptoms is usually handled through routine follow-up with the clinician or service that ordered the test.

What you can do

If you receive an antibody result, ask exactly which antibody was tested and why. The name of the target is essential for understanding the result.

Useful questions include:

Keep a record of relevant vaccinations, previous infections, allergies, pregnancies, blood transfusions, and immune treatments. These details can help place a result in context.

Do not use an antibody result on its own to decide whether you are contagious, protected from infection, or able to stop prescribed treatment. Those conclusions may require other tests and clinical information.

If no antibody test has been recommended and you have no related health concern, there is usually nothing specific you need to measure or track.

- Does this test look for infection, immunity, allergy, or autoimmunity?
- Could vaccination or a previous infection explain the result?
- Was the test done at the right time?
- Is the result qualitative, quantitative, or a titre?
- Could another test confirm or clarify it?
- Does this result change my care?

Common questions

Are antibodies always helpful?

No. Most antibodies support immune defence, but some contribute to allergies, autoimmune disease, transfusion reactions, or other immune problems.

Does a positive antibody test mean I have an infection now?

Not necessarily. It may show past infection, vaccination, or another immune reaction. Tests that detect the organism itself, such as some antigen or genetic tests, may be more useful for active infection.

Does a negative test rule out exposure?

No. Testing may have occurred before antibodies developed, after levels declined, or with a test that does not detect the relevant response.

Are antibodies the same as antibiotics like amoxicillin or doxycycline ?

No. Antibodies are immune proteins made by the body or manufactured as targeted medicines. Antibiotics are medicines used to treat certain bacterial infections.

Can one antibody test check the whole immune system?

No. Each test has a defined target. Other tests may be needed to assess antibody amounts, immune-cell function, or a response to vaccination.

Do monoclonal antibody treatments stay in the body forever?

No. They are gradually broken down. How long they remain and what monitoring is needed are specific to the medicine.

Sources

- National Institute of Allergy and Infectious Diseases. Overview of the Immune System
- MedlinePlus. Antibody Serology Tests
- National Cancer Institute. Definition of monoclonal antibody
- Centers for Disease Control and Prevention. Overview of Testing for SARS-CoV-2
- U.S. Food and Drug Administration. Antibody Testing Is Not Currently Recommended to Assess Immunity After COVID-19 Vaccination
- Lu LL, Suscovich TJ, Fortune SM, Alter G. "Beyond binding: antibody effector functions in infectious diseases." Nature Reviews Immunology . 2018;18:46-61. Article record